# PatchView+ System Architecture

## *General*

PatchView+ is a new, patent pending physical Intelligent Infrastructure Management (IIM) system that supports mixed cross-connect and true interconnect network topologies. This state-of-the-art smart IIM system architecture allows easy growth, control and management of an unlimited number of ports in real time.

The system supports both copper (high-end CAT6A and above) and fiber (RiT Xlight 100GB) solutions, or combinations of copper and fiber in the same system. The system also supports complete zero "U" installation for maximum space savings.

Because the system architecture does not interrupt data flow, no additional load is placed on the network.

The system has been designed with the minimum number of components to maintain simplicity.

The system is modular and is constructed with the following components.

- LED Frame (fiber or copper)
- Zero "U" Smart Scanner device with dual latches
- Collector
- Agent
- Tablet
- Smart ID device
- ID Reader/Writer
- Smart Patch cord (copper, fiber)
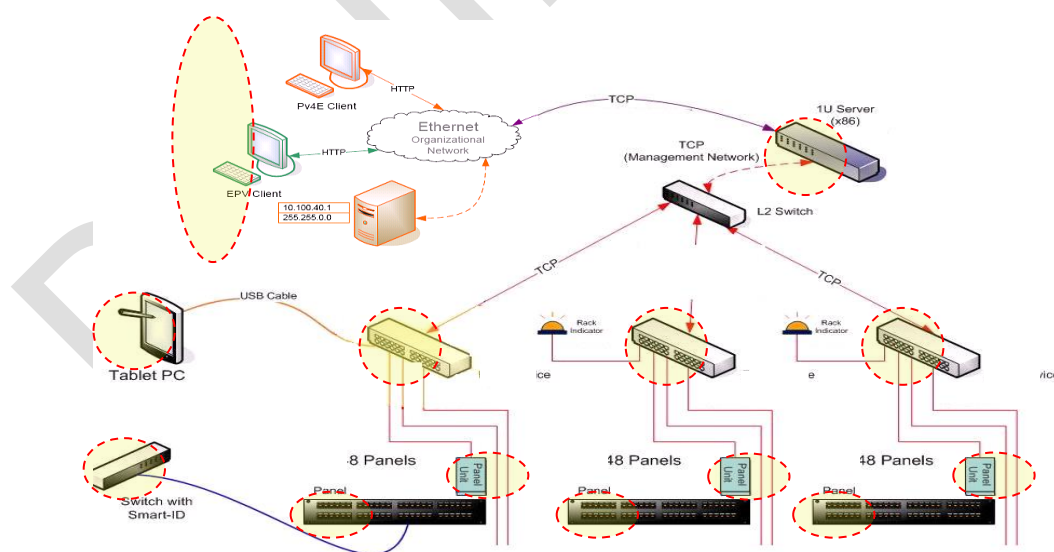- Optional Environmental/Security Controller



**Fig. 1 System block diagram**

## *Features*

- ✓ Zero "U" Smart Scanner and Collector installation
- ✓ Zero "U" optional Environmental/Security Controller installation
- ✓ Side panel Smart Scanner installation (easy to maintain with minimum interruptions)
- ✓ Asynchronous parallel scanning architecture
- ✓ Less than 2 second scan cycle with unlimited site size
- ✓ High security
- ✓ Each scanner supports 24 ports with fast scanning rate
- ✓ 2 Amps per Collector driver port
- ✓ Standard RJ-45 patch cords from Smart Scanner to Collector
- ✓ Data-over-power from Collector to Scanner
- ✓ True interconnect support that saves rack space
- ✓ Cross-connect support for a higher level of security
- ✓ Smart ID device for true switch port recognition
- ✓ Smart ID device stores useful link information (switch, rack, cable type, revision level, etc.)
- ✓ Interconnect enables LED signaling of make/break status
- ✓ Audible alert for all unauthorized make/break operations
- ✓ High-end smart copper and fiber management frames and cassette trays
- ✓ Smart Tablet application for switch learning and programming
- ✓ Smart Tablet application for work order receipt and closure
- ✓ Offline/Online Tablet operation
- ✓ Tablet IP communication over USB to agent
- ✓ Agent WEB application (may be installed on any computer)
- ✓ Supports an unlimited number of agent installations
- ✓ Agent SDK for easy interfacing to other application
- ✓ Auto detection/registration of newly added or moved collectors/panels
- ✓ Interconnect with CenterMind software
- ✓ TCP/IP cascaded Collector communication link minimizes switches
- ✓ Unique panel ID number

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# *Architecture*

PatchView+ supports a simple, modular architecture configured from basic building blocks as described below. The PatchView+ architecture allows for unlimited growth with minimal effect on system performance.

## Panel

### General

PatchView+ supports mixed true interconnect and cross-connect network topologies.

Each panel has a unique ID number that allows unambiguous identification within the system.

Each panel has a mini USB socket, enabling connecting a tablet PC to the panel and to the agent through the Collector.

Each panel port includes two touch/sense points that complete a parallel MODBUS, enabling reading of the Smart ID devices throughout the system.

### Copper Frame

The PatchView+ Copper Frame is a high performance yet cost effective Keystone CAT6A Copper Frame that enables building a simple and modular architecture. The PatchView+ Copper Frame supports mixed cross-connect and interconnect network topologies. By incorporating a unique ID device within the frame and working together with autosense topology discovery, the location of each frame within the network as well as its position within a rack is available at all times, even after a frame has been relocated.

Two sense points in each frame port construct a parallel MODBUS, enabling smart ID scanning, system-wide polling, and message routing for unique monitoring, control, and maintenance of the system.

The PatchView+ Copper Frame is a smart, high-end CAT6A managed frame, able to accept up to 24 RJ-45 CAT6A/CAT6/CAT5E UTP/STP keystones. To assist technicians in monitoring, configuring, and troubleshooting, a multi-mode LED and push button are incorporated into the frame as well as a single LED above each port. In addition, each frame includes a mini-AB USB connector, enabling connection to an external tablet PC or to the agent via the Collector.

On the rear of each frame is a socket that accepts a zero "U" Smart ID Scanner device. The Scanner supplies power and commands to the port LEDs and patch cords, and also enables reading of the smart ID devices.

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Each PatchView+ Copper Frame is built of four layers, with a fifth layer added for STP frames. The layers include

■ Front frame keystone holder

■ Chassis

■ PCB frame

■ Back frame keystone holder

■ STP Fingers (for STP frames only)
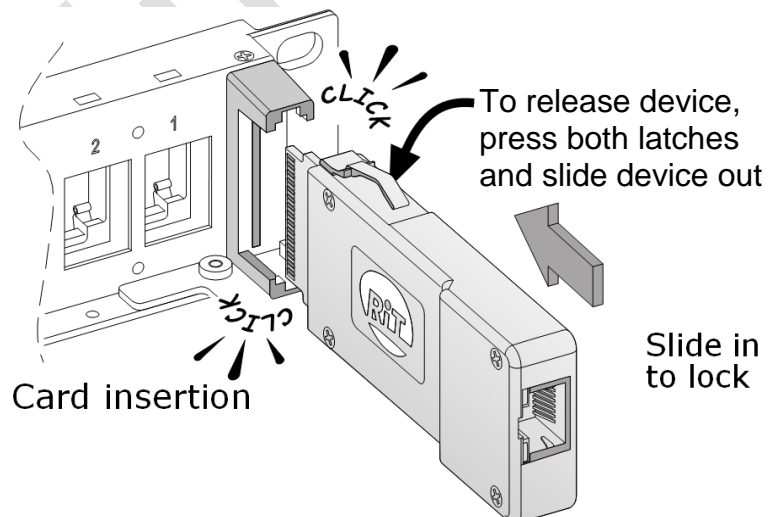


**Fig. 2 Copper Frame, front**



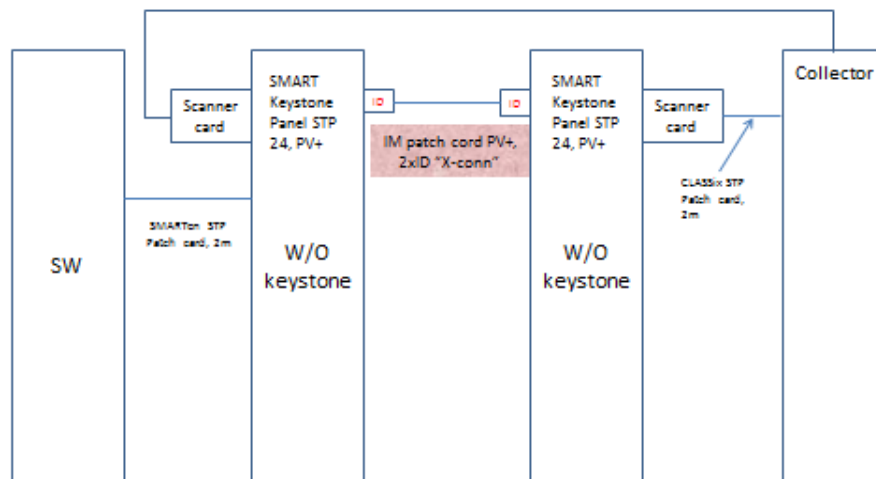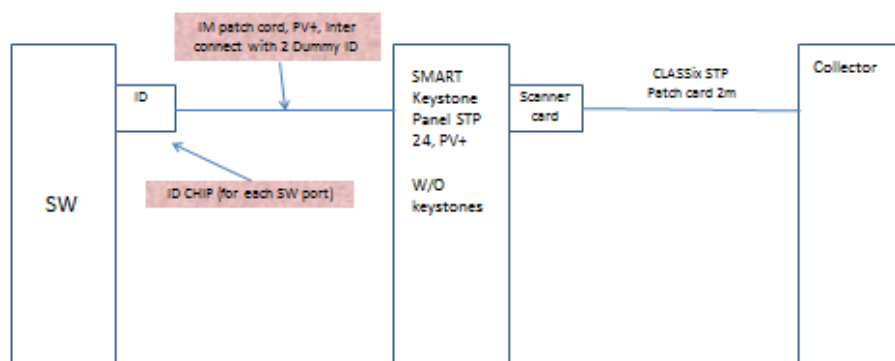**Fig. 3 Copper Frame, rear with Smart Scanner and socket**

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## Copper Cross Connect



**Fig. 4 Copper cross-connect topology**

## Copper Inter Connect



**Fig. 5 Copper interconnect topology**

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## Fiber Tray (Cassette)

The PatchView+ Fiber Tray is a cost effective component in building a modular architecture with the advantages offered by fiber optics. The PatchView+ Fiber Tray supports mixed cross-connect and interconnect network topologies. Three fiber connection options are supported: LC-LC, LC-MPO, and MPO-MPO. The Fiber Tray also supports both Single-Mode (SM) and Multi-Mode (OM4) cassettes.

By incorporating a unique ID within the frame along with two sense points in each frame port, system-wide ID polling and message routing are made possible, enabling unique monitoring, control, and maintenance of the system.

The PatchView+ Fiber Tray is a smart, high-end fiber optics managed tray, able to accept up to 96 LC-LC fiber patch cords along with a full management system. To assist technicians in monitoring, configuring, and troubleshooting, a bi-color LED is incorporated into the tray as well as a single LED above each port in the cassette.

The Fiber Tray also includes a pushbutton that enables support personnel to initiate manual port scanning to view system connectivity.

On the rear of each tray are two sockets that accept a zero "U" Smart Scanner device utilizing minimum rack space. The Scanner supplies power and commands to the port LEDs and also enables reading of the smart ID devices, tracking the position and connectivity of each fiber patch cord.

Each PatchView+ Fiber Tray is built of four layers.

- Front tray adapter holders
- Chassis
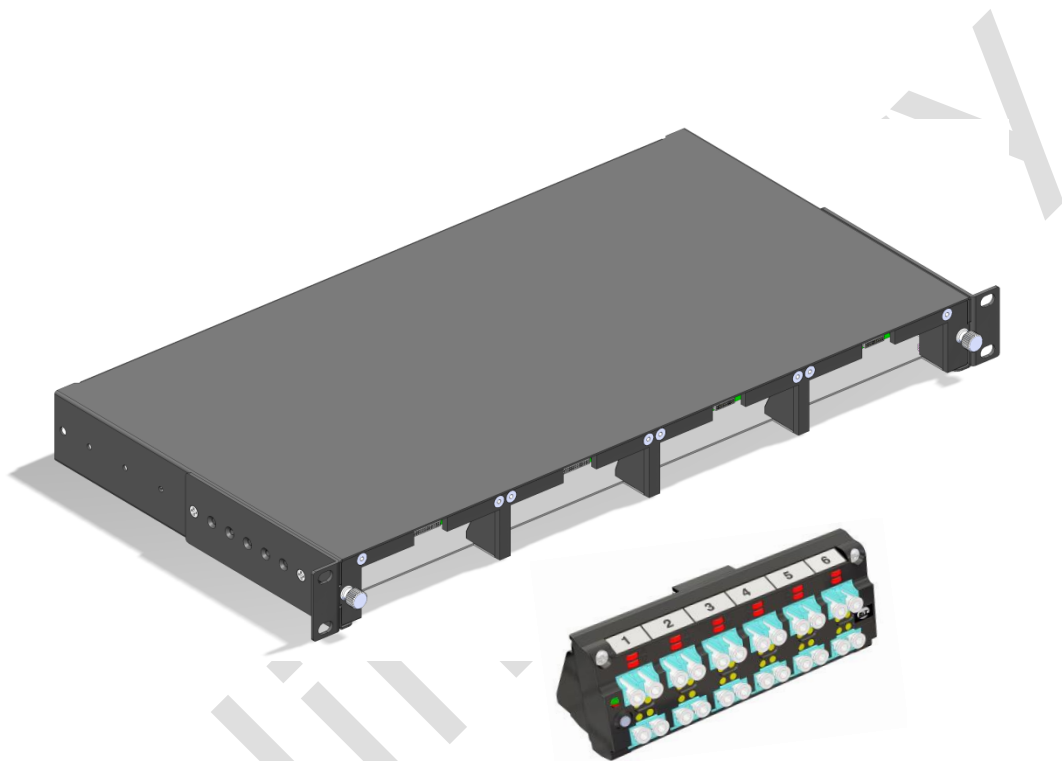- PCB frame
- Back tray Smart Scanner holder

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**Fig. 6 Fiber Tray, front**

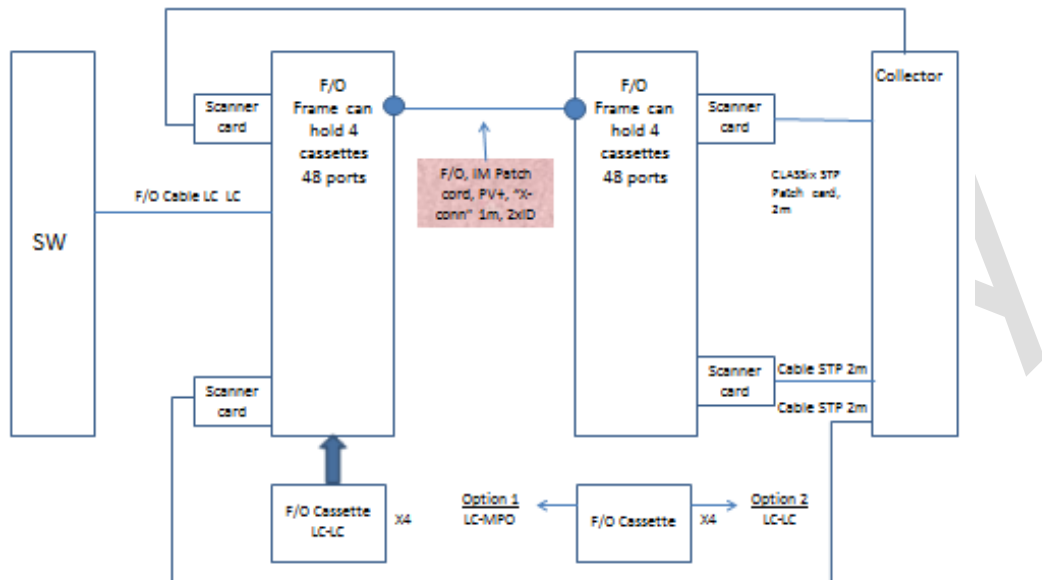*Confidential*

## F/O Cross Connect



**Fig. 7 Fiber cross-connect topology**
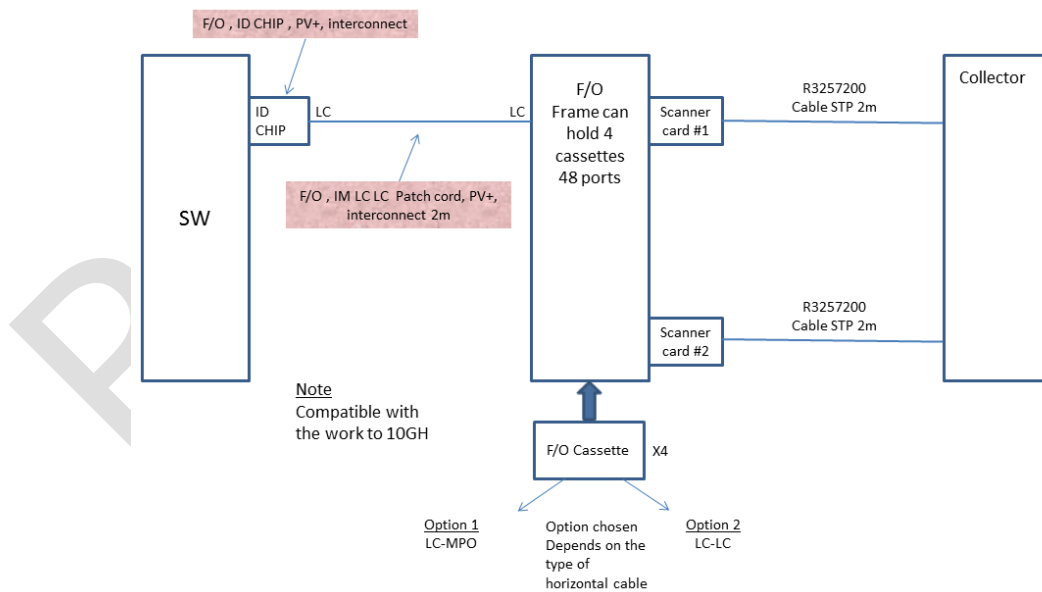
## F/O Inter Connect



**Fig. 8 Fiber interconnect topology**

## Smart Scanner

The PatchView+ Smart Scanner is a pluggable device that supports physical network identification on interconnect and cross-connect topologies. The PatchView+ Smart Scanner automatically detects and reads up to 24 smart ID devices present on each copper frame or fiber tray and on patch cords.

The Smart ID Scanner also supplies power and routes commands to the port LEDs located above each panel port. Every Scanner contains unique ID information, enabling proper identification and communication on the Intelligent Infrastructure Management (IIM) network. The Scanner communicates over a single-wire protocol, parallel bus in an asynchronous mode, resulting in an outstanding scanning time of less than 500 mS per 24 port panel.

The scanner's firmware is easily updated through its MODBUS RJ-45 connection via the Collector.

The Smart ID Scanner is connected via a socket on the back of the frame using dual mounting latches, locking the Scanner securely in place for enhanced reliability. The Scanner receives power and communicates with higher-level system components through a standard RJ-45 connector.
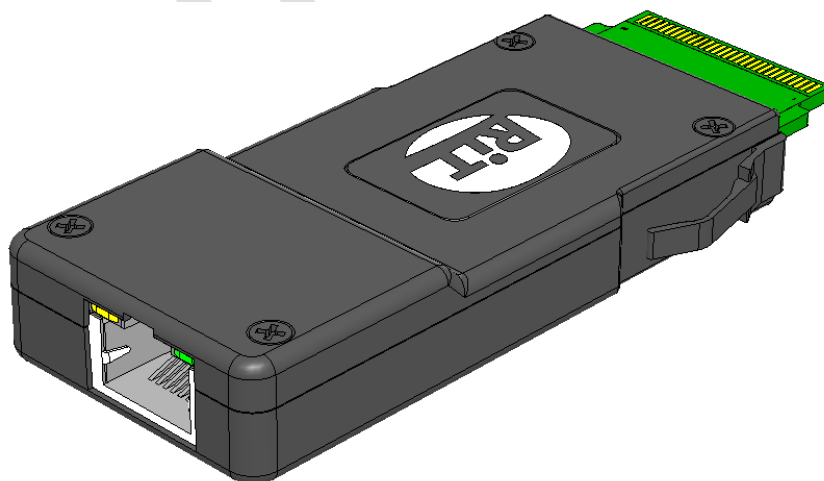


**Fig. 9 Smart Scanner**

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## Collector

The PatchView+ Collector sits between the Smart panel Scanners and agents to provide bi-directional communications between the two devices. The Collector "collects" data from the Scanner and routes it to a specified Agent on request. The Collector also sends various commands to the Scanners. Each Collector supports up to 24 Scanners, with each Scanner capable of supporting 24 ports, resulting in a single Collector capable of supporting up to 576 ports.

The Collectors may be installed in either a zero "U" configuration for rack space optimization or as a 19" single "U" configuration.

To communicate with the Agents, the Collector supports up to four TCP/IP ports through an unmanaged L2 switch, saving on main switch ports and enabling cascading of Collectors to provide unlimited network growth.

The Collector is also capable of connection to an external device, such as a tablet PC, via a USB mini-AB connector, and to a USB device, such as a flash drive, via a host type A USB socket.

The Collector is powered through the mains supply via a power socket on the rear, and supplies power to the scanners over the RJ-45 connector.

All communication between the Scanner and Collector is performed via RS485 using the MODBUS protocol running at 115,200 kbps.

The Collector communicates with the Agents and the Scanners. The Collector sends commands to the Scanners from the Agents, and receives information from the Scanners. The collected information is sent to the Agent upon request.
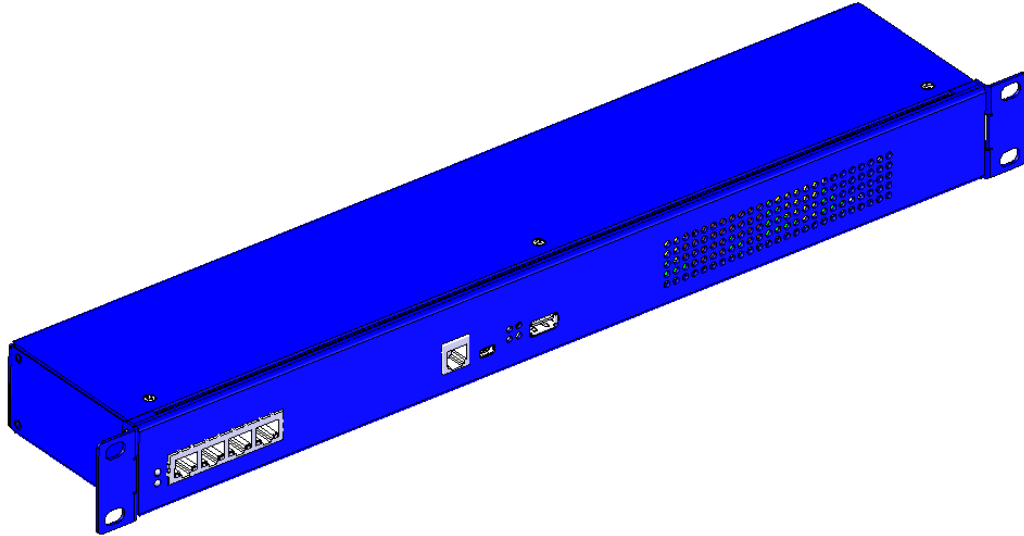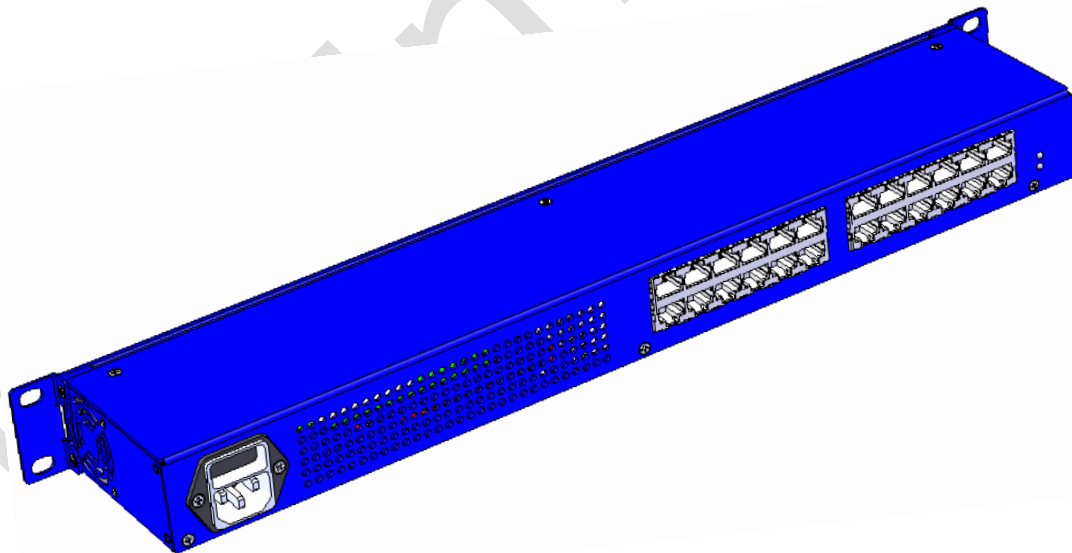
**Fig. 10 Collector, front**



**Fig. 11 Collector, rear**

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## Copper Patch Cord

PatchView+ high performance CAT6A copper Patch Cords support cross-connect and interconnect topologies. The cord is constructed from high-end CAT6A STP cord combined with two additional stranded wires to produce an eight-wire cord. The cord is terminated with special patented RJ-45 plugs that include two soft, conductive, flexible touch points. In addition, each plug includes an LED indicator.

Cross-connect topology includes two smart ID devices, one on each end of the patch cord. Interconnect topology includes one smart ID device at the switch side. The plugs on the interconnect patch cord are fitted with a dummy latched cover that enables easy insertion and removal from the frame or switch.
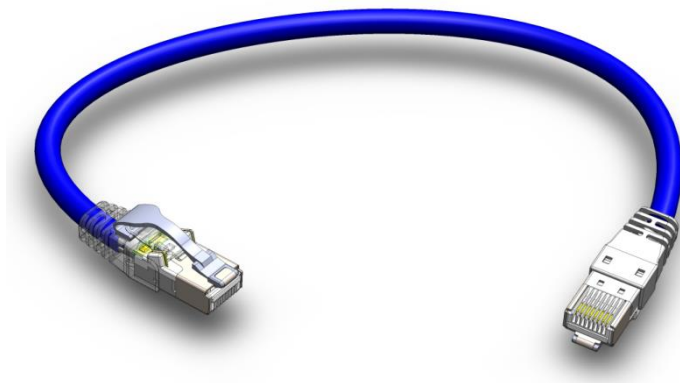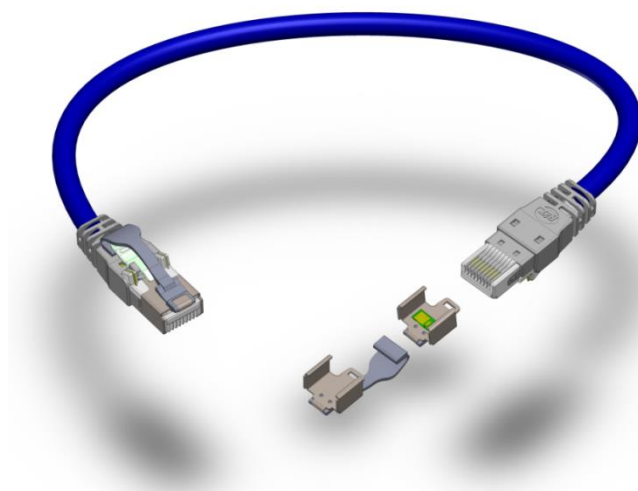
**Fig. 12  Cross-connect copper Patch Cord**
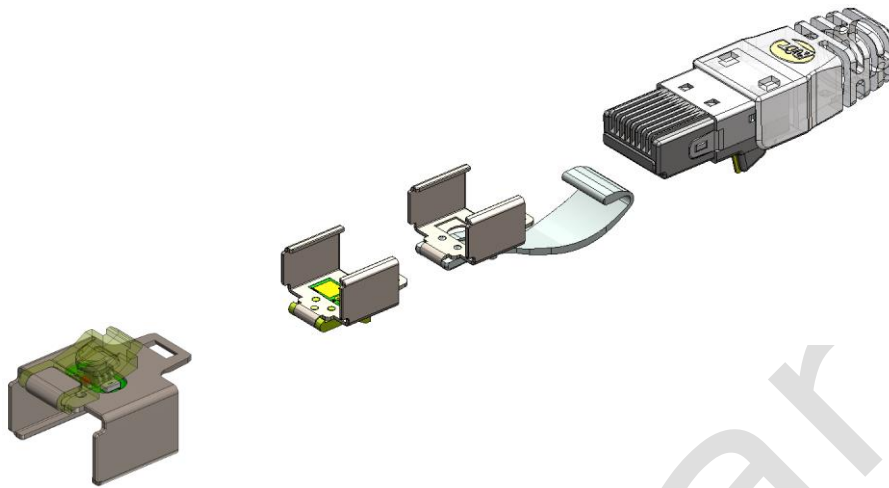
**Fig. 13  Interconnect copper Patch Cord**

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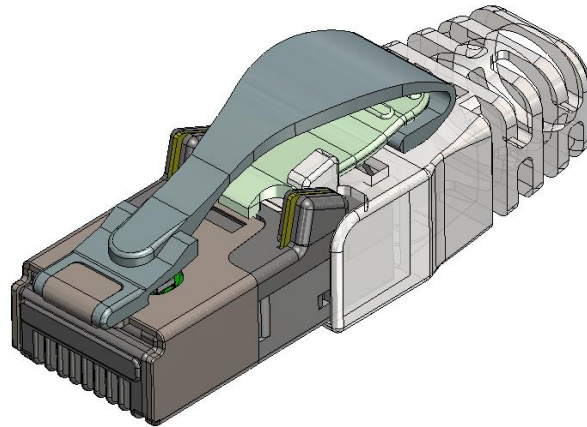**Fig. 14 Copper Patch Cord dummy**



**Fig. 15 Copper Patch Cord plug assembly**

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## Agent

The Agent is a software device that collects and sends information from/to the individual Collectors. The Agent uses an asynchronous communications method.

The Agent may be regarded as a bi-directional database that holds real-time information gathered from all of the Collectors that are registered in the system. A synchronization update for all Collectors is initiated at a pre-determined time interval.

The Agent may be downloaded and installed in any machine or on a RiT appliance. An unlimited number of Agents may be installed in a network.

The Agent communicates with the Collectors via TCP/IP, enabling rapid transfer of a large quantity of data between Collector and Agent. When an Agent is placed into the system and becomes operational, it begins to search for Collectors and begins the registration procedure that associates Agents with Collectors.

For each Collector that is registered to an Agent, the Agent collects information and then sends a copy of the information either to the CenterMind software or to an API for processing.

When a firmware upgrade is required for the Smart Scanners, the Agent receives the upgrade information from the CenterMind software and then sends the information through the Collectors to the Smart Scanners.

If a work order is pending, the Agent will send the work order to the tablet PC as soon as a communications channel has been established between the tablet and the Agent. The tablet PC will update the Agent through the Collectors on all work order procedures that have been performed.

For more detailed information about the Agent and its interactions with other devices, please review the Agent User Manual and API.

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